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Pauline Bourgeon, Jean-Charles Bricongne

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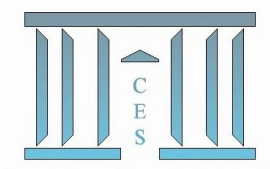

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Financing Time to Trade*

Pauline Bourgeon [1] and Jean-Charles Bricongne [2]

[1]Banque de France and Université Paris 1 - Panthéon Sorbonne
[2]Banque de France, European Commission, DG for Economic and Financial Affairs

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Abstract

This paper provides new firm-level evidence of the impact of financial frictions on international trade. First, by drawing on a unique instrument to capture financial frictions at a firm level, we address concerns about endogenous measures of firms' financial constraints. Second, we empirically test the role of distance and long trading time in reinforcing the negative effect of financial frictions on firms' exports. We use detailed customs and balance sheet data combined to a unique dataset on payment incidents among firms to conduct this empirical analysis. We find that financial frictions significantly reduce firm's export sales. Our estimations show a significant effect of distance and trading time in reinforcing the negative effect of financial frictions on export sales.

JEL Classification: D22, F10, F14.
Keywords: distance, financial frictions, firm's exports, international trade, trading time.

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1 Introduction

Exporting involves higher liquidity needs than selling domestically and part of these extra needs are due to higher costs that might be overcome by access to external finance. These additional costs partly cover costs associated to longer shipping time. Thus financial health is a key determinant for firm export activities.

This paper investigates how financial frictions impact firms' foreign sales and especially for firms that export to long distance export markets. Throughout this paper financial frictions represent any type of friction that may affect firms' access to external finance. This term is relatively broad and encompasses credit constraints as well as dependence to external finance. For firms, having access to external finance is a key condition to bear all the upfront costs of production. This is especially true for exporters for whom these costs are higher and the time elapsed between the production and revenues from the sale of this production is longer.

To conduct our analysis we process in three steps. First, we exploit various measures of firms' financial frictions to confirm previous findings on financial constraints and exports. Using a rich dataset we perform our analysis with several measures of financial frictions and find that exporters that enjoy better levels of financial health export bigger volumes. Second, we address the issue of endogeneity by using a unique instrument for measuring financial frictions at a firm-level. Firms' exporting activities and financial indicators might be jointly determined and then raise an endogeneity bias. Having access to data on payment failures among firms we use them to instrument financial frictions variables. Namely, we use payment failures generated by trading partners as an exogenous measure of financial shock hitting the exporting firm. Thus, we obtain an exogenous measure of firms' financial constraints that is used as an instrument and we tackle the endogeneity issue. The results provided by this instrumentation strategy are very similar to the ones obtained by the baseline OLS estimation. Third, we complement our analysis of the role of financial constraints on export activities by focusing on the specific roles of distance and trading time on exporters witnessing financial frictions. Our results suggest that amongst exporters facing financial difficulties, those that export to faraway destinations (or to long exporting time markets) reduce their export sales more than the ones exporting to closer destinations. These results show the effect of distance or trading time in reinforcing the negative effect of financial frictions and suggest that exporters decide to reduce their exports to the costliest destinations. We test the robusness of our results performing different models of estimation, we especially perform additional regressions on a subsample containing only firms exporting to a single foreign market.

Financial frictions and exports. Exporters have specific liquidity needs that may reinforce the effect of financial frictions on their export activities. Unlike domestic sellers exporters incur additional costs of two types: fixed and variable costs. Fixed costs

are various, they encompass costs due to serving a new destination. These latter include adaptation costs to adapt the product sold to a new foreign market (studying the market potential, building and maintaining a distribution network, etc.). Exporters also incur fixed costs associated to each export shipping, as costs of filling customs declarations. Finally, they incur additional variable costs due to higher transportation costs -explained by longer shipping time- higher risks and duties. All of those additional costs translate into higher liquidity needs for exporters and therefore higher vulnerability to financial frictions. The literature dealing with financial frictions and exports has mostly focused on the role of fixed costs while little evidence exists on variable costs. Difficulties into financing variable costs should affect export volumes to a destination. This is exactly the impact of financial frictions on export sales we study in this empirical analysis. Intuitively, exporters facing financial frictions would have difficulties to finance variable costs associated to export activities and would therefore reduce their volume of export sales to a destination. Theoretically, this mechanism has been modelled and studied by Manova (2009) who estimates that most of the impact of credit constraints on trade happens through the volume of exports. Empirically, this model has been tested but results remain inconclusive. A few papers confirm the result from Manova (2013) while others do not find a significant impact of financial constraints on export sales (Berman and Héricourt (2010), Stiebale (2011)). To provide new evidence on this question we focus our analysis on export sales (i.e on the intensive margin of trade) and do not study the role of financial frictions on the entry and exit on foreign markets (i.e the extensive margin) or other types of export dimensions (destinations portfolio, number of products exported, etc.). We then complement this initial analysis by studying the specific roles of distance and into reinforcing the effect of financial frictions on export sales. Distance largely determines the amount of variable trade costs which is why long distance destinations are costlier to serve than others. By investigating the role of distance on export sales of exporters facing financial frictions we want to shed light on this particular reinforcing effect.

Related literature. Our research relates to the growing literature at the boundary between international trade and finance. This literature has become seminal with works studying the relationship between financial development and international trade at a country level. Bardhan and Kletzer (1987) provide a model of international trade in which financial development offers a source of comparative advantage to countries. Empirical works complement this theory and show that countries with higher financial development have a comparative advantage in financially vulnerable sectors (Beck (2002), Ju and Wei (2011)). At the sectoral level, Rajan and Zingales (1998) confirm the aggregate finding from Bardhan and Kletzer (1987).

Most directly, this paper contributes to the literature on financial constraints and international trade. Chaney (2013) provides a theoretical model that incorporates financial constraints and firm heterogeneity (this is an adaptation of the seminal framework from Melitz (2003)). This model predicts that a restricted access to external finance constitutes

an additional obstacle to exporting activities that only the most productive firms would be able to overcome. Manova (2013) proposes an alternative theoretical framework that models three channels through which credit constraints affect firms' exports. The first one deals with the selection of firms into domestic production, the second one deals with the selection of producing firms into exporting and the last one deals with the level of firm export sales. Our work provides new empirical estimations of this latter channel.

The previous theoretical finding is complemented by several empirical studies at a firm-level. They suggest that financially constrained firms are less likely to export, to fewer destinations, fewer volumes and lower varieties (Greenaway et al. (2007), Muûls (2008), Manova et al. (2014), Minetti and Zhu (2011), Askenazy et al. (2015)). If most of the papers in this literature agree on the impact of financial frictions on firms selection into exporting, their results differ in terms of the impact of firms' financial frictions on the level of export sales. Berman and Héricourt (2010) explore the role of firms ' financial health measured by liquidity and leverage ratios on exports over 5,000 firms in 9 developing countries. They do not find any significant impact of financial frictions on export survival and on the level of exports. Stiebale (2011) also concludes to an insignificant impact of firms' financial frictions on export activity.

Apart from Minetti and Zhu (2011) who provide an instrumental variable for firms' financial frictions, all the papers cited above use endogenous measures of firms' financial frictions, meaning that they exploit firms' financial frictions indicators that are endogenous to firms' export strategies. They exploit variables such as liquidity or leverage ratios that are interpreted as indicators signalling a limited access to external capital while these indicators may also signal a high demand for capital to develop firms' exports. Therefore the interpretation of liquidity or leverage ratios as financial frictions may be misleading. Besides, being able to export to some markets may be interpreted as a positive signal by financers, alleviate financial constraints and influence the value of these ratios, inducing reverse causalitu. Our work thus extends the literature by providing a unique exogenous measure to acurately capture firms' financial frictions.

Another strand of empirical studies focuses on the role of financial frictions on exports during crises. Although our study does not cover those specific time periods it relates to parts of the results found in this literature. Bricongne et al. (2012) and Behrens et al. (2013) exploit respectively French and Belgian firm-level data and find the negative effect of firms' financial frictions on exports was higher during the recent financial crisis for firms in financially dependent sectors.

Finally, by exploring the specific roles of distance and trading time on financially constrained exporters, we contribute to another strand of the literature studying trading time as a trade barrier. Throughout the paper we define trading time as the time elapsed to export products, it mainly includes shipping time and time spent at customs. As briefly mentioned above even in the very globalized world we live now, distance and trading

time still matter for international trade. Indeed, in spite of the decrease in international transportation costs, these may impact significantly margin rates for some companies and influence their decisions. Papers exploring the role of shipping time on bilateral trade conclude that longer distance or shipping time negatively affect both the probability of exporting and the volumes of exports. Hummels (2001) estimates that each extra day spent in transport reduces the probability that the U.S will import from this country. Djankov et al. (2012) exploits World Bank Doing Business Indicators and finds that each extra day spent at the customs reduces trade by more than 1%.

More recently a few papers have linked the role of shipping time to the negative impact of financial frictions. At the country-level Schmidt-Eisenlohr (2013) finds that the negative effect of financial frictions on trade is reinforced by distance. Our results provide micro evidence of this latter estimate. Berman et al. (2013) also show that bilateral aggregate trade during the financial crisis was decreasing more the longer the distance between origin and destination countries. At the firm-level, Feenstra et al. (2015) and Manova et al (2014) show that credit constraints reduce export more the longer the shipping time.

Our paper aims at providing new insights regarding the impact of firms' financial frictions on export sales and therefore contributes to the literature presented above. The remainder of the paper is organized as follows. The next section describes the data. Section 3 motivates and details our empirical strategy. Section 4 presents the results and section 5 details additional results. Section 6 concludes.

2 Data and measurement

2.1 Sources of data

To conduct our empirical analysis we combine six types of data, firm balance sheet data, firm-level trade flows, firms payment failures, firms financial links geographic distances and exporting time indicators.

Balance sheet data. Our first source of data is the French balance sheet data BRN (Bénéfices Réels Normaux), it is an official dataset relying on data from the French fiscal administration. This dataset is built by the French statistical institute (INSEE) on records of fiscal declarations from domestic French firms. It includes firms from all sectors and size classes since there is no threshold on the number of employees. Firms with at least a 763 K euros yearly turnover (230K euros for services) are obliged to send their balance sheet to the French fiscal administration and smaller firms may send it as well if they choose the normal tax regime. This dataset provides us information on financial variables, employment, value added, the sector, the year and all balance sheet items. The BRN original dataset includes

around 60% of the total number of French firms but it is very representative as it covers on around 94% of the French GDP. [1] This database has another great advantage by including both small and large firms. This database contains information regarding the main activity of firms and since we focus our analysis on exporters we have restricted the sample to firms having exported at least once over the studied period (1995-2007). We also restrict our analysis to exporters in manufacturing and services sectors excluding wholesale trade and financial activities. One might think that firms operating in services sectors may be less affected by a restricted access to finance since costs associated to transport and distance are lower. However, Crozet and Millet (2014) provide evidence that most French exporters belonging to the services sectors also export goods. We exclude wholesale traders since we expect them to have different export strategies from the other exporters which export what they produce. We also exclude financial activities because this sector presents very specific issues regarding financial frictions. We have also cleaned the original dataset by dropping firms with negative assets or other extreme observations.

Trade flows. Our second source of firm-level data comes from the French customs. They record export flows with product, firm and destination dimensions. Exports must be declared to French Customs if one of the two following requirements is satisfied. If the destination is not in the EU, all exports above 1,000 euros or 1,000 kilograms must be declared. If destination is a EU member state the declaration is compulsory if the yearly cumulated value of exports to the other EU member states is larger than 150,000 euros. Each recorded trade flow contains information on the value and the quantity traded. Since we do not exploit details at the product level, we sum trade flows at the firm, year and destination dimension. We easily match these trade flows with the balance sheet data thanks to the firm unique identifier (SIREN number) on a yearly basis.

Payment incidents. We then complement these two first sources of data with a unique dataset produced by the Banque de France. This information come from French banks which are legally obliged to report any payment default on trade creditors to the "Système Interbancaire de Télécompensation" within four business days. These payment incidents are gathered by the Banque de France which makes this information available to French commercial banks during one year.[2] Any single French commercial bank has therefore access to this information and may use it to evaluate creditworthiness of firms granting for a loan. Payment Incidents can be interpreted as an indicator of credit constraints: a firm which has failed to pay over the last 12 months would have more difficulties to get a new loan or would get a smaller amount of loan (Aghion et al. 2012). With this unique information we are able to precisely measure financial distress at the firm-level and we

[1] see Eaton et al. (2011) or Berman et al. (2015) for more details on this database

[2] This dataset has been previously used by Askenazy et al. (2015), Bricongne et al. (2012) and Aghion et al. (2012).

build an exogenous measure of firms' financial frictions by taking the partners' payment incidents which should impact the related firm financial health.

LIFI survey. To control for firms group belonging, we complement our dataset with data from the Financial Links between Enterprises Survey (LIFI survey) produced by the French national statistical institute INSEE. This dataset provides us information on the groups of enterprises operating in France and allows us to identify if a firm is a head of a group, a subsidiary, is considered in the periphery of the group (it is the case if the group is a minor shareholder of the given firm) or is independent. This information is also available on a yearly basis, we therefore match it with our previous data using the firm identifier by year. This survey has a good coverage but small and very small enterprises may be underrepresented. This should not be a concern in our case since small firms do not export much anyway and, besides, may not be covered by the French customs database if their exports are under the thresholds.

Geographic distances. To be able to study the specific role of trading time on financially constrained exporters, we exploit two alternative proxies. First, we use a geographic distance variable. We extract the variable of geographical distances from the CEPII distance database. This variable simply gives the geodesic distance between the most important cities of the origin and destination countries.[3]

Exporting time. To complete measures of trading time we exploit the indicator of importing time from the World Bank Doing Business database. This indicator measures time to import in days in the destination country. This time includes time for obtaining, preparing and submitting documents during port or border handling, customs clearance and inspection procedures. From the French exporters' point of view this indicator represents time to export. We therefore call this variable exporting time. As this indicator is only available from 2011, we keep the values of 2011 as reference for our estimations. [4]

2.2 Measuring financial frictions

Financial ratios. In our empirical study we exploit several indicators of firms' financial frictions. Following previous works in the literature, we use three ratios computed from firms' balance sheet: the liquidity ratio ($Liquidity_{it}$), the collateral ratio ($Collateral_{it}$) and the financial charges ($FinCharges_{it}$). These indicators have been previously used in the literature but because of data limitations they were rarely used together in the same study. Here, thanks to the richness of our data we can alternatively exploit these three indicators and thus obtain a comprehensive estimation of the effects of firms' financial frictions on their exports.

[3]More information are available on the internet at www.cepii.fr

[4]More information are available on the internet at http://www.doingbusiness.org

We define $Liquidity_{it}$ as the ratio of short-term liabilities over short-term assets. This variable measures a liquidity constraint, a high level of liquidity ratio means that the firm's short-term debt is higher than its short-term assets. The firm may therefore encounter difficulties to finance investment and this may also lead to a restricted access to external finance. This variable has been previously used by several authors but results remain inconclusive. Minetti and Zhu (2011) and Askenazy et al. (2015) conclude that low levels of liquidity materialize a restricted access to external finance and negatively affects firms export activities. Berman and Héricourt (2010) conclude to an insignificant effect of liquidity on firms' export participation. Givord and al. (2008) suggest an a specific interpretation of liquidity ratio in the case of French firms. They show that compared to firms from other industrialized countries, French firms may use short-term assets as precautionary savings because they have a restricted access to bank credit. A low level of liquidity ratio may reflect simultaneously a low level of short-term liabilities and a high level of short-term assets. In that case a low level of liquidity ratio should be interpreted as a credit constraint. The indicator $Collateral_{it}$ is defined as the ratio of total assets over tangible assets. This variable reflects the ability for a firm i to raise external finance. Defined this way it means that the higher level of this variable is, the more financial constrained firm i is. Indeed, a low level of tangible assets should restrict the access to external finance.
The variable $FinCharges_{it}$ is computed as the ratio of financial charges over turnover. This variable reflects the dependence of firm i to external finance. Based on results found by previous empirical studies we expect this variable to be negatively correlated to the volume of exports.

Payment incidents. We complement these variables with other measures of financial frictions coming from the Payment Incident database produced by the Banque de France. We first compute an indicator $Firm - PI_{it}$ that measures the yearly amount of payment incidents generated by firm i over its turnover. This indicator reflects the difficulties experienced by a firm to pay its French trading partners. The negative impact of firms' payment incident on access to credit has been demonstrated by Aghion et al. (2012). We consider this variable more precise than the financial measures presented above since it reflects realised financial shocks while financial ratios approximate financial shocks. While previous works exploiting this database were using a dummy variable indicating if the firm has witnessed any payment incident over the year, in this work we use a continuous indicator by computing the amount of payment incidents over the year. We derive a second indicator from this database. We define $Partners - PI_{it}$ as the yearly amount of firm i's partners payment incidents (generated by the firm's trading partners) over its turnover. As the database contains the firm identifier of both the debtor and the creditor, we are able to identify firms which have failed to pay a bill to any of the French exporters in our data. This way we are able to identify external financial frictions that affect French exporters. We consider this second indicator as an exogenous measure of firms' financial frictions since it captures the financial shocks experienced by firm i independently from its own activities.

Table 1 provides the correlation coefficients among the five variables of firms' financial frictions. Most of the variables are positively correlated, only the indicator $Liquidity_{it}$ is negatively correlated with most other financial frictions variables. This latter finding is consistent with Givord et al. (2008) in the case of France. Even if this table shows mainly positive correlations among those five alternative measures of firms' financial frictions, it therefore asserts the relevance of the use of these various measures as their levels of correlation are very low.

Table 1: Correlation between firms' financial frictions variables

	$Liquidity_{it}$	$Collateral_{it}$	$FinCharges_{it}$	$Firm-PI_{it}$	$Partners-PI_{it}$
$Liquidity_{it}$	1.000				
$Collateral_{it}$	-0.189	1.000			
$FinCharges_{it}$	-0.013	0.246	1.000		
$Firm-PI_{it}$	0.033	0.007	0.021	1.000	
$Partners-PI_{it}$	-0.010	0.046	0.044	0.062	1.000

Note: authors' computation from BRN and Payment Incident databases over the period 1995-2007. All coefficients are significant at 1% level. Variables are all taken in logarithm. The number of observations is 4,700,082 including 152,169 firms.

2.3 A first glance at the data

This section provides statistics describing firms of our sample. The resulting data is an unbalanced panel containing 152,169 firms, on average 51,700 by year over 1995-2007. This sample is representative of the French economy as it includes firms of all sizes and all sectors exporting to 189 destination countries. Our final sample represents around 85% of French total exports over the period.

Table 2 shows that on average a firm exports a yearly amount of 257.33 K euros to a destination j while its yearly export sales - including all the destinations served - amounts to $23,037$ K euros. In our sample, the average export share - measured by the ratio of export sales over total sales - is around 33%. Regarding the financial variables, we see that on average a firm has a liquidity ratio of 0.47 meaning that its current liabilities are backed by a larger amount of short-term assets. The mean value of the collateral ratio indicates that around two thirds of firms' assets are made of tangible assets, even if there is some variance between firms, depending among others of the sector. The variance of export sales also reflects a high level of heterogeneity among firms. Indeed, as it is well documented in the literature, our statistcis confirm that a small fraction of big firms represent the vast majority of French exports. We could complement this table with two interesting features: in our sample, 18.3% of observations have generated a payment incident and 22.3% of observations have suffered from some payment incidents generated by their partners.

Table 2: Firms' characteristics and financial frictions variables

Firm characteristics	p25	mean	p50	p75	sd
Turnover	3,184	64,518	9,654	33,765	286,622
Export flow	5.53	257.33	24.40	122.97	816.05
Export sales	317	23,037	1,727	9,299	113,017
Export share	0.061	0.335	0.224	0.499	0.657
Total assets	2,312	76,818	7,794	31,271	537,934
Number of employees	15	248	45	156	1,722
Labour productivity	38.249	61.752	51.797	72.750	38.525
Financial frictions variables					
Liquidity ratio	0.326	0.472	0.449	0.590	0.204
Collateral ratio	1.280	1.708	1.505	1.892	0.667
Financial charges	4.62E-07	8.78E-06	2.10E-06	8.04E-06	1.86E-05

Note: authors' computation from BRN, customs and Payment Incident databases over the period 1995-2007. All monetary variables are expressed in thousands euros. Export flow corresponds to the yearly amount of firm exports to country j. Export sales is the yearly amount of exports at the firm level. Export share is computed as the ratio of export sales over turnover. The number of observations is 4,700,082 including 152,169 firms.

3 Empirical methodology

3.1 Baseline specification

Our aim is to study the role of financial frictions on the volume of exports to a single destination. For this purpose we want to estimate the following model:

$$EX_{isjt} = \beta FinFriction_{it} + \mu_i[+\gamma_{st}][+\gamma_s + \gamma_t] + \gamma_{jt} + \epsilon_{it} \quad (1)$$

where EX_{isjt} represents the sum of exports of firm i belonging to sector s to country j over the year t. $FinFriction_{it}$ stands for the level of firm i's financial frictions observed during year t. In our study we exploit several measures of financial frictions that are described in the previous section. μ_i denotes firm-specific unobserved characteristics.We include two combinations of fixed effects. The first one includes γ_{st} and γ_{jt} that represent sector-year and country-year fixed effects capturing respectively sector specific and destination specific shocks. Controlling for sector-year specific shocks that may affect export trade volumes is essential to get an accurate estimation. The second combination of fixed effects keeps γ_{jt} and introduce γ_s and γ_t to capture respectively time-invariant characteristics across sectors and specific time events common to all firms. Our coefficient of interest is β, we expect it to be negative since the literature has provided a large body of evidence that financial frictions negatively affect the level of exports. In the estimations all variables are taken in logarithm. Many exporting firms in the sample observe zero values for the variables $Firm-PI_{it}$ and $Partners-PI_{it}$ we therefore take the log of one plus the amount af these variables.

Control variables. With this specification we account for unobserved heterogeneity with various control variables X_{it}^k. Using control variables helps us to precisely disentangle the effect of firms' financial frictions on their export volumes. We control for size with the amount of total assets and the number of employees of firm i at time t. As shown in the literature size is a key determinant both for export volumes and access to finance. We also control for firms' productivity by using the level of labour productivity (measured by value added per employee). The role of firms' productivity on export activities has been largely attested by recent works. Finally, we control for firms' group linkages by using information from the LIFI survey. We define four dummy variables to account for the four different status (deatiled in section 2.1). The firm can be the head of a group, or part of a group, in the periphery of a group or independent. Belonging to a group or being part of a consortium of firms may help the firm to export by taking benefit of existing distribution networks abroad, or may influence its access to external finance.

Fixed effects. We use sector-year dummy variables to control for sector specific shocks. It therefore captures all the time-varying changes at the sector level that may affect firms' export volumes or access to finance. We identify firms' industry through their main activity reported in their balance sheet, one firm is associated to only one sector but may change of industry over time. Industries are then defined using the NAF rev. 2 classification at the 2-digit level. We also introduce country-year dummy variables to account for time varying changes at the destination country level that are relevant for our estimation. For example, it capture changes of the demand on the destination market or exchange rate moves. We alternatively use country-year or country and year dummies to control for country time invariant characteristics such as geographic factors, cultural factors, etc. Year dummies capture shocks that affect all the countries over the same year, as a global financial shock for instance.

Endogeneity issues. Endogeneity is a concern in equation (1), an estimation of our coefficient β might be biased. Indeed, there is a concern of reverse causality since we cannot exclude the possibility that export sales affect firms' financial frictions. The relationship between firms' export sales and financial frictions may be simultaneous and therefore threatens the validity of the estimated baseline model. To tackle this issue we would process instrumental regressions detailed in the next section. One might think of another source of endogeneity, namely the omitted variable bias. We cannot rule out the possibility that firms' export sales correlate with unobserved firms' characteristics and our instrumentation strategy deals with this concern.

3.2 Instrumentation

As explained in the previous section our baseline estimated model may suffer from an endogeneity bias because of reverse causality. To tackle this issue we need to use an exogenous measure of firms' financial frictions. The Payment Incident database described

in section 2 provides us this crucial indicator to measure exogenous financial frictions: the indicator $Partners - PI_{it}$. Indeed we expect that when firm i's trading partners fail to pay it, this payment failure directly affects firm i's financial health. And these payment failures on firm i are fully exogenous, meaning that they are fully independent to its export sales. The variable $Partners - PI_{it}$ is exogenous to firm i export strategy.

We estimate an instrumented model where the various indicators $FinFriction_{it}$ are instrumented by the variable $Partners - PI_{it}$. We estimate this model processing a 2SLS estimation with the same control variables and fixed effects as in the baseline specification. In all estimations, standard errors are clustered at the firm*year level and robust to heteroscedasticity.

3.3 Trading time interaction

Trading time and financial frictions. To complement our analysis of the impact of firms' financial frictions on export sales, we focus on the specific effect of trading time on this relationship. The question of trading time as a trade barrier has been largely studied in the literature but the analysis of the specific effect of trading time on exporters facing financial frictions is new. As discussed in the introduction, a strand of literature focuses on the role of distance or shipping time on firms' exports but they do not consider the particular case of financially distressed exporters. We motivate the analysis of this question by simply arguing that trading time may reinforce the effect of financial frictions. This reinforcing effect is suggested by a few papers (Schmidt-Eisenlohr (2011), Berman et al. (2015), Manova et al. (2013) and Feenstra et al. (2015)). Firms facing financial frictions are more vulnerable and they may be forced to adjust their export strategy. Since we focus on the volumes of export sales, we consider that firms witnessing financial distress may decide to reduce their exports to some destinations. They would adjust to this shock through their intensive margin because they lack financial capacities to maintain their previous levels of exports. Here, the question we ask is: do exporters facing financial frictions reduce their exports to markets characterized by long trading time? Our first intuition is simply that longer trading time is costlier because it requires longer shipping time, which is equivalent to higher opportunity costs. In the meanwhile we know that these faraway markets (in terms of geographic distance or exporting time) are very hard to reach because it requires a high level of fixed costs to enter. Firms need to invest time and money to learn about the market, they may need to invest in R&D to adapt their product to the specificities of the market, they need to develop a distribution network, etc. All these fixed costs are higher for faraway destinations. Therefore, an alternative strategy in case of financial frictions might be to reduce export volumes to closer markets where fixed costs associated to the export activities are lower. Consequently, the effect of trading time on exporters witnessing financial frictions remains inconclusive. By estimating this effect we provide new evidence on this question.
Table 3 gives the extra-Europe top-20 destinations served by firms from our sample, the volumes exported and the distance figures associated to these destinations. We focus on extra-Europe destinations to get a better idea which are the key long distance markets for

French exporters. Here we see that on average 12,239 firms from our sample sell to the US o each year over the period (there are more than 18,000 to export to Germany); they are less than 7,000 to export to Japan which is one of the furthest destination. We also see that while Russia is closer in terms of distance to France than China, it requires 12 additional days to export to this country. This table clearly shows that the two proxies of trading time (distance and exporting time) provide complementary information.

Table 3: Top 20 destinations extra Europe

Country	Export (millions €)	Distance (Km)	Exporting time (days)	Exporting firms (N)
United States	4,679.8	5,838	5	12,239
Japan	2,107.3	9,726	11	6,537
Algeria	1,568.1	1,340	13	7,274
Tunisia	1,550.2	1,484	17	8,542
Morocco	1,529.8	1,817	17	8,975
Turkey	1,274.9	2,256	15	4,776
Canada	1,255.2	6,005	11	5,912
China	1,246.6	8,225	24	3,457
Russia	1,099.6	2,494	36	3,350
Hong Kong	1,026.5	9,639	5	4,617
South Korea	977.4	8,981	7	3,411
Brazil	861.5	9,408	17	3,019
Australia	857.7	16,975	8	3,698
Mexico	734.1	9,207	12	2,409
Senegal	725.9	10,748	4	3,391
Taiwan	723.6	9,834	12	3,290
United Arab emirates	703.8	5,250	7	3,567
Saoudi Arabia	679.8	4,695	17	3,148
Israel	663.7	3,282	10	4,441
South Africa	640.4	9,354	35	2,928

Note: authors' computation from BRN, customs and Payment Incident databases over the period 1995-2007. The statistics reported in the table above are the yearly average of each variable over the period 1995-2007.

Interaction model. We therefore estimate the following model by interacting financial frictions and trading time:

$$EX_{ijt} = \beta_1(FinFriction_{it}) + \beta_2(FinFriction_{it}) * TradingTime_{it} + \beta_3 TradingTime_{it} + \beta^k X^k_{it} + [+\gamma_{st}][+\gamma_s + \gamma_t] + +\gamma_{jt} + \varepsilon \quad (2)$$

when estimating this model we keep the same indicators of $FinFriction_{it}$ as in the baseline model, we also keep the same controls and fixed effects. The novelty comes from

the interaction terms, in this specification the variable $FinFriction_{it}$ is interacted by a dummy variable $TradingTime_{it}$. This latter variable relates to a geographic distance indicator (called $longDist_{it}$) or alternatively to an indicator measuring exporting time (called $longExTime_{it}$). To build $longDist_{it}$ we compute at the firm-level the average distance of all exports realised by a firm i during year t. We then compute the median of this variable across the firms of our sample and define the dummy variable $longDist_{it}$ that equals to one if the average distance travelled by a firm's yearly exports is higher than the median; and to zero otherwise.
Similarly we compute the firm-level average exporting time (in days) associated to all exports realised by firm i during year t. We then define $longExTime_{it}$ equals to one if the average exporting time associated with a firm's yearly exports is higher than the median; and to zero otherwise. On average, firms' export travel 1,900Km and require 15 days to reach the destination.[5]

4 Results

4.1 Baseline results

Table 4 shows the results of the estimated baseline model using the five alternative measures of firms' financial frictions. Each column corresponds to one distinct measure of firms' financial frictions as explanatory variable. We clearly see that our results are very significant (at the 1% level) and in line with our expectations. In column (1) liquidity ratio is positively correlated with the level of firms' export sales. A higher liquidity constraint corresponds to higher levels of export sales. This result might be surprising, even though evidence was not conclusive on the effect of liquidity on exports. We might have thought that a higher level of liquidity ratio corresponds to a restricted access to external finance and therefore lower export sales. This mechanism is not asserted by our estimations but are in line with results from Givord et al. (2008) already mentioned in section 2.2. With column (2) we see that firms having lower tangible assets export less, it confirms previous results in the literature. Low levels of tangible assets materialize a credit constraint and therefore hinders exporters to finance variable costs of exporting. Complementary to this result with column (3) we find that firms paying higher amounts of financial charges export less.

The other measures of firms' financial frictions computed from the Payment Incidents database complement these first results. According to column (4) exporters having generated significant payment incidents on their trading partners export significanlty fewer volumes. This latter may be coherent with the results from column (5). We have a great interest for these last results since the variable $Partners - PI_{it}$ is used for the first time.

[5] One interesting feature of the indicator of exporting time is its level of dispersion. The firm-level average exporting time exhibits a standard deviation more than 8 times the one associated to the firm-level average distance.

Table 4: Baseline results: OLS estimations

	Dependent variable: $Export_{ijt}$									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Financial frictions	$Liquidity_{it}$	$Collateral_{it}$	$FinCharges_{it}$	$Firm-PI_{it}$	$Partners-PI_{it}$	$Liquidity_{it}$	$Collateral_{it}$	$FinCharges_{it}$	$Firm-PI_{it}$	$Partners-PI_{it}$
Coefficient ($\hat{\beta}$)	0.128***	-0.136***	-0.066***	-7.512***	-27.944***	0.129***	-0.135***	-0.066***	-7.688***	-27.543***
	(0.004)	(0.006)	(0.002)	(2.637)	(0.876)	(0.004)	(0.006)	(0.002)	(2.642)	(0.871)
Control variables										
Total assets	0.621***	0.601***	0.554***	0.602***	0.599***	0.621***	0.601**	0.553***	0.601***	0.598***
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
Productivity	0.100***	0.099***	0.071***	0.097***	0.096***	0.100***	0.099***	0.072***	0.097***	0.097***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Nb employees	-0.240***	-0.2258***	-0.229***	-0.219***	-0.217***	-0.240***	-0.225***	-0.229***	-0.219***	-0.216***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Group	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,700,069	4,700,069	4,700,069	4,700,069	4,700,069	4,700,083	4,700,083	4,700,083	4,700,083	4,700,083
# Clusters (it)	672,001	672,001	672,001	672,001	672,001	672,015	672,015	672,015	672,015	672,015
R^2	0.235	0.235	0.236	0.234	0.235	0.235	0.234	0.235	0.234	0.234
Year F.E	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Sector F.E	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Country*Year F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector*Year F.E	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No

Note: Robust standard errors, clustered by firm*year in parentheses. All variables are in logs. The sample covers firms over 1995-2007 from all sectors excluding financial activities and wholesale trade. Superscripts ***, **, * denote statistical significance at the 1, 5 and 10% levels respectively.

This variable captures the level of payment incidents that have affected each firm i, it measures exogenously firms' financial frictions. We see that exporters having been hit by large amount of payment incidents witness lower levels of export sales. This negative effect significantly reduces the level of export sales. The coefficients associated to the variables $Firm - PI_{it}$ (-7.5) and $Partners - PI_{it}$ (-27.9) are much higher than the ones associated to the other measures of firms' financial frictions and they should not be interpreted as elasticities. This is explained by the way we measure payment incidents[6].

We note that coefficients associated to control variables are all significant and in line with what has been previously found in the literature. Bigger firms (measured by their total assets) and more productive firms export more. One might be surprised to see that in our regressions the size of the labour force is negatively correlated with export sales. This may be due to a high correlation (more than 80%) between the variables number of employees and total assets. Indeed this negative sign turns positive if we only include the number of employees as control instead of including both the number of employees and the amount of total assets. However, we prefer including these two variables simultaneously as control variables to account better for unobserved heterogeneity among firms.

4.2 Instrumentation results

Our baseline results are highly significant and in line with what is found in the literature but we cannot exclude that those results might be biased because of endogeneity. This issue has been detailed in section 3. Table 5 presents the results of the 2SLS estimations where we instrument each measure of firms's financial frictions by the variable $Partners - PI_{it}$. Each column from (1) to (4) and from (5) to (8) presents the results for the four alternative measures of firms' financial frictions. Columns (1) to (4) correspond to regressions including sector*year and country*year fixed effects and columns (5) to (8) to regressions including year, sector and country*year fixed effects.
Results in columns (1) and (5) confirm that liquidity is positively correlated with export sales, even when we instrument this measure of firms' financial frictions with the variable $Partners - PI_{it}$. Instrumentation does not change the estimated effect of liquidity on export sales we find for our sample. Columns (2) and (6) corroborate that a low level of tangible assets prevents firms from exporting much. Columns (3) and (7) present results associated with the variable $FinCharges_{it}$ and show that a higher amount of financial charges is negatively related to the level of firms' export sales. Finally, the results of our main interest are the ones from column (4) and (8). As found in our baseline estimation

[6]We estimate the model by tatking the log of $1+Firm - PI_{it}$ and the log of $1+Partners - PI_{it}$. Therefore, as the ratio of payment incident over turnover is very close to zero when taking the differential of the variable $(1+PI)$ we obtain something very close to zero. Consequently the coefficient measuring $\frac{\frac{dx}{x}}{\frac{d(PI)}{(PI)}}$ is high as the denominator is close to zero

we clearly see a negative and strong impact of firms' own payment incidents on their level of exports. With this 2SLS estimation, we tackle the endogeneity issue and clearly find that firms witnessing financial frictions and being unable to pay their bill to one or more trading partners have lower levels of export sales. In all the 2SLS estimations the strength of our instrument variable is confirmed by the Kleibergen-Paap statistic. This statistic is the heteroskedastic and clustering robust version of the Cragg-Donald statistic provided by Stock and Yogo (2005). This is a test for weak instruments, the value of this statistic should be greater than the 10% level critical value of 16.38. As all the columns show a level of this statistic greater thant the critical value, our results confirm that the variable $Partners - PI_{it}$ is a strong instrument for other measures of firms' financial frictions. We note that coefficients from the control variables are highly significant and as for the baseline results, we observe that the number of employees is negatively correlated with export sales. This might be unexpected but it may be explained by a high correlation of this variable with the amount of total assets.
Overall results from the 2SLS estimations confirm the ones obtained with our baseline estimations. One might be surprised by the very high magnitude of some coefficients associated to financial frictions variables, especially the one of the indicator $Firm - PI_{it}$. This magnitude simply reflects the low magnitude of the coefficient associated to the variable $Firm - PI_{it}$ in the first-stage regression (presented in Appendix B). Indeed, the coefficient associated to the effect of $Partners - PI_{it}$ (the instrument variable) on $Firm - PI_{it}$ is very small (around 0.008, cf. table 10 in Appendix B). We therefore end up with a high coefficient in the second stage (cf. columns (4) and (8) of table 5 the coefficient is greater than 3,600 in absolute terms). [7]

4.3 Trading Time interaction results

Distance Interaction. Table 6 presents results of the estimations including the interaction of firms' financial frictions with distance, it corresponds to the model described by equation 2. As presented in section 3.3 these estimations aim at capturing the effect of trading time proxied by distance in reinforcing the negative impact of firms' financial frictions on export sales. Column (1) shows results slightly different from previous results using liquidity as a variable of firms' financial frictions. Firms with a higher liquidity rtio do not export less than the others but it is less true for firms exporting to further destinations. Indeed the coefficient of the interaction term is negative although the total effect of liquidity on export sales (it corresponds to the sum of the coefficients β_1 and β_2) remains positive. The positive values for β_3 may signal a favorable selection effect, not taken into account by control variables. There would be a positive signal on performance sent by the exporter to potential financers when selling to remote destinations. Yet, the negative β_2 coefficient of the interaction between financial frictions and distance indicates at the same time that financial frictions are all the more detrimental to exports as distnace increases.

[7] This is explained by the fact that $\beta_{2SLS} = \frac{dy/dz}{dx/dz}$ with y referring to the dependent variable, x to the instrumented variable and z to the instrument variable.

Table 5: 2SLS estimations

	Dependent variable: $Export_{ijst}$ 2SLS estimation with Instrument variable:$Partners - PI_{it}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Financial frictions	$Liquidity_{it}$	$Collateral_{it}$	$FinCharges_{it}$	$Firm - PI_{it}$	$Liquidity_{it}$	$Collateral_{it}$	$FinCharges_{it}$	$Firm - PI_{it}$
Coefficient ($\hat{\beta}$)	7.106**	-7.663***	-0.786***	-3,625.192***	6.448***	-7.187***	-0.784***	-3,850.433***
	(0.976)	(0.682)	(0.034)	(423.620)	(0.819)	(0.611)	(0.035)	(478.390)
Control variables								
Total assets	1.689***	0.590***	0.030	0.592***	1.584***	0.573***	0.031***	0.592***
	(0.149)	(0.010)	(0.026)	(0.008)	(0.125)	(0.009)	(0.026)	(0.009)
Productivity	0.245***	0.165***	-0.219***	-0.1628***	0.235***	0.166***	-0.217***	-0.178***
	(0.029)	(0.015)	(0.015)		(0.013)	(0.014)	(0.015)	(0.036)
Nb employees	-1.361***	-0.542***	-0.336***	-0.214***	-1.251***	-0.518***	-0.335***	-0.214***
	(0.157)	(0.031)	(0.007)	(0.009)	(0.131)	(0.027)	(0.007)	(0.009)
Group	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,700,069	4,700,069	4,700,069	4,700,069	4,700,083	4,700,083	4,700,083	4,700,083
# Clusters (it)	672,001	672,001	672,001	672,001	672,015	672,015	672,015	672,015
Kleibergen-Paap stat.	54.519	140.042	987.868	73.816	64.422	156.362	970.849	67.938
Year F.E	No	No	No	No	Yes	Yes	Yes	Yes
Sector F.E	No	No	No	No	Yes	Yes	Yes	Yes
Country*Year F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector*Year F.E	Yes	Yes	Yes	Yes	No	No	No	No

Note: Robust standard errors, clustered by firm*year in parentheses. All variables are in logs. The sample covers firms over 1995-2007 from all sectors excluding financial activities and wholesale trade. Superscripts ***, **, * denote statistical significance at the 1, 5 and 10% levels respectively.

Table 6: Interaction with distance

	Dependent variable: $Export_{ijt}$									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Financial frictions	$Liquidity_{it}$	$Collateral_{it}$	$FinCharges_{it}$	$Firm-PI_{it}$	$Partners-PI_{it}$	$Liquidity_{it}$	$Collateral_{it}$	$FinCharges_{it}$	$Firm-PI_{it}$	$Partners-PI_{it}$
FinFriction (β_1)	0.151***	-0.120***	-0.055***	-3.572	-22.270***	0.152***	-0.118***	-0.055***	-4.027	-22.001***
	(0.004)	(0.007)	(0.002)	(2.907)	(0.993)	(0.004)	(0.007)	(0.002)	(2.902)	(0.990)
FinFriction*longDist(β_2)	-0.027***	-0.069***	-0.014***	-7.688	-9.435***	-0.028**	-0.069***	-0.014***	-7.125	-9.129***
	(0.007)	(0.010)	(0.002)	(5.405)	(1.743)	(0.007)	(0.011)	(0.002)	(5.638)	(1.743)
longDist(β_3)	0.383***	0.439***	0.209***	0.403***	0.406***	0.382**	0.438***	0.211***	0.402***	0.405***
	(0.007)	(0.006)	(0.024)	(0.004)	(0.004)	(0.007)	(0.007)	(0.024)	(0.004)	(0.004)
Control variables										
Total assets	0.601***	0.579***	0.534***	0.580***	0.578***	0.600***	0.579***	0.533***	0.580**	0.577***
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
Productivity	0.092***	0.091***	0.064***	0.089***	0.088***	0.093***	0.092***	0.065***	0.090***	0.089***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)	(0.004)
Nb employees	-0.250***	-0.235***	-0.239***	-0.228***	-0.226***	-0.250***	-0.234***	-0.238***	-0.228***	-0.225***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Group	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Observations	4,700,069	4,700,069	4,700,069	4,700,069	4,700,069	4,700,083	4,700,083	4,700,083	4,700,083	4,700,083
# Clusters (it)	672,001	672,001	672,001	672,001	672,001	672,015	672,015	672,015	672,015	672,015
R^2	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.240	0.241
Year F.E	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Sector F.E	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Country*Year F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector*Year F.E	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No

Note: Robust standard errors, clustered by firm*year in parentheses. All variables are in logs. The sample covers firms over 1995-2007 from all sectors excluding financial activities and wholesale trade. Superscripts ***, **, * denote statistical significance at the 1, 5 and 10% levels respectively.

Column (2) shows that when measured with the variable $Collateral_{it}$, firms' financial frictions have a negative impact on firms export sales and this effect is significantly higher for firms exporting to faraway destinations. Results in column (3) confirm this pattern but with coefficients of lower magnitude. The negative effect of financial charges on export is lower than when firms' financial frictions are measured with a collateral constraint. Column (4) presents results in line with the ones associated to the variable $Firm - PI_{it}$ using the baseline specification. We clearly see that firms witnessing financial frictions and generating payment incidents export less, and this is even more true for firms exporting to further destinations. Finally, column (5) presents the results of our main interest. This column shows that firms having witnessed payment incidents generated by their trading partners export less, and this effect is higher for firms exporting to further destinations.

All the results presented above confirm the reinforcing effect of trading time (proxied by distance) on the negative impact of firms facing financial frictions on export sales. This effect appears particularly strong when we use the payment incident indicators to measure firms' financial frictions. To complement these results we exploit an alternative indicator of trading time, a measure of exporting time (in days) described in section 3.3.

Exporting Time interaction results. Table 7 shows the results of the estimations of model (2) using exporting time as a proxy for trading time.[8] These results are broadly comparable to the previous onesn taking into account standard errors. They depict a stronger effect of trading time in reinforcing the negative impact of firms' financial frictions on export sales. Columns (1) and (6) present results showing that firms with a higher liquidity constraint do not reduce their export sales while the ones exporting to further destinations do. Columns (2) and (7) bear out the negative impact of a collateral constraint on fims' export sales and this impact is magnified by longer exporting time. With results presented in columns (3) and (8), we see that a high level of financial charges is negatively correlated with firms' export sales and the reinforcing effect of exporting time is close to zero. Results in columns (4) and (9) reaffirm the strong effect of firms' payment incidents on firms' export volumes and this effect is largely amplified by longer exporting times. The more striking result is displayed in columns (5) and (10) where we see that firms suffering from payment incidents generated by their partners reduce their export sales with a coefficient of the $Partners - PI_{it}$ variable equal to around -22 for firms exporting in average to close destinations and around -38 [9] for firms exporting to remote destinations. For these latest firms, the negative effect of financial frictions is almost doubled due to remoteness, even if the positive signal sent by remote exports smooths out somewhat this negative effect (coefficient of the variable of long exporting time equal to 0.243).

[8] Results in Table 7 are estimated on a slightly smaller sample of countries as the indicator of exporting time is not available for 18 countries.

[9] This coefficient corresponds to the sum of β_1 and β_2 i.e -38=-22.471-15.232

Table 7: Interaction with Exporting Time

	Dependent variable: $Export_{ijt}$									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Financial frictions	$Liquidity_{it}$	$Collateral_{it}$	$FinCharges_{it}$	$Firm-PI_{it}$	$Partners-PI_{it}$	$Liquidity_{it}$	$Collateral_{it}$	$FinCharges_{it}$	$Firm-PI_{it}$	$Partners-PI_{it}$
FinFriction	0.127***	-0.046***	-0.060***	-4.61	-22.471***	0.128***	-0.045***	-0.060***	-4.967*	-22.240***
	(0.005)	(0.007)	(0.002)	(3.022)	(1.087)	(0.005)	(0.007)	(0.002)	(3.031)	(1.084)
FinFriction*longExTime	-0.009	-0.188***	-0.003***	-7.087	-15.232***	-0.103**	-0.187***	-0.003*	-6.733***	-14.820***
	(0.008)	(0.011)	(0.002)	(5.562)	(1.784)	(0.008)	(0.011)	(0.002)	(5.568)	(1.784)
longExTime	0.225***	0.325***	0.186***	0.235***	0.243***	0.224**	0.325***	0.183***	0.235***	0.242***
	(0.007)	(0.007)	(0.025)	(0.004)	(0.004)	(0.008)	(0.007)	(0.025)	(0.004)	(0.004)
Control variables										
Total assets	0.617***	0.596***	0.554***	0.598***	0.596***	0.617***	0.595***	0.553***	0.598***	0.595***
	(0.004)	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.003)
Productivity	0.097***	0.096***	0.070***	0.094***	0.093***	0.098***	0.096***	0.071***	0.095***	0.094***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Nb employees	-0.251***	-0.236***	-0.241***	-0.231***	-0.229***	-0.251***	-0.235***	-0.240***	-0.231***	-0.228***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Group	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Observations	4,522,640	4,522,640	4,522,640	4,522,640	4,522,640	4,522,654	4,522,654	4,522,654	4,522,654	4,522,654
# Clusters (it)	662,063	662,063	662,063	662,063	662,063	662,077	662,077	662,077	662,077	662,077
R^2	0.234	0.234	0.235	0.233	0.234	0.234	0.234	0.234	0.233	0.234
Year F.E	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Sector F.E	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Country*Year F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector*Year F.E	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No

Note: Robust standard errors, clustered by firm*year in parentheses. All variables are in logs. The sample covers firms over 1995-2007 from all sectors excluding financial activities and wholesale trade. Superscripts ***, **, * denote statistical significance at the 1, 5 and 10% levels respectively.

5 Additional results

5.1 Single-destination exporters

The literature studying exporters has emphasized that most exporters export only to one single market. This result has been confirmed with French data by Eaton and al. (2014) who find that more than 30% of French exporters exactly export to only one destination. To test that our results are robust to the case of the average French exporting firm, we perform the same regressions on the subsample of single-destination exporters.

OLS estimations Table 8 shows results of the OLS model estmated on the subsample of single-destination exporters. Results are very similar to the baseline ones, although we end up with a significant lower number of observations.

2SLS estimations We complement the OLS estimation by performing 2SLS estimations on the subsample of single-destination exporters. Results are presented in table 9. The coefficients β of the main variables of interest are in the whole comparable to the ones in table 5 (especially when considering the magnitudes of standard errors) and thus results seem to be robust, except for the liquidity ratio variables[10]. One should notice that the Kleibergen-Paap statistics signals that the $Partners-PI_{it}$ variable is no longer a strong instrument for the $Liquidity_{it}$ variable in this restricted sub-sample of single-market exporters.

6 Conclusion

Firms' financial frictions have a significant impact on firms' export sales. Throughout this study we estimate this impact by exploiting various indicators of firms' financial frictions. We find that firms' financial frictions significantly reduce export sales. We exploit a unique instrument to exogenously measure firms' financial frictions that allows us to tackle the issue of endogeneity. Finally, we investigate the specific role of trading time proxied alternatively by distance and an indicator of exporting time and an interesting pattern has emerged from this analysis. Our results support for a reinforcing effect of trading time on the negative effect of firms' financial frictions on their export volumes.

We believe that our analysis provides new insight on the key role of finance for exporters. Our finding would plead for policies to ease access to finance for exporters and in this way foster export performance in developed economies. If the findings related to French frims

[10] Coefficients associated to control variables in table 9 all appear with a negative signs in column (3) and (4). This might be surprising but it is no longer the case when we exclude one of these control variables in the estimation. This latter notice should not change the interpretation of our results as we consider these variables only as control variables

Table 8: OLS regression with single-market exporters

	Dependent variable: $Export_{ijt}$									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Financial frictions	$Liquidity_{it}$	$Collateral_{it}$	$FinCharges_{it}$	$Firm-PI_{it}$	$Partners-PI_{it}$	$Liquidity_{it}$	$Collateral_{it}$	$FinCharges_{it}$	$Firm-PI_{it}$	$Partners-PI_{it}$
Coefficient ($\hat{\beta}$)	0.093***	-0.185***	-0.061***	-12.501***	-28.874***	0.093**	-0.182***	-0.061***	-12.891***	-28.520***
	(0.005)	(0.007)	(0.002)	(3.150)	(1.182)	(0.005)	(0.007)	(0.002)	(3.143)	(1.174)
Control variables										
Total assets	0.555***	0.542***	0.493***	0.539***	0.538***	0.554***	0.541***	0.491***	0.538***	0.537***
	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Productivity	0.019***	0.016***	-0.004	0.016***	0.016***	0.0196***	0.016***	-0.003	0.017***	0.017***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Nb employees	-0.321***	-0.314***	-0.313***	-0.305***	-0.303***	-0.320***	-0.313***	-0.312***	-0.304***	-0.302***
	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)
Group	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	671,886	671,886	671,886	671,886	671,886	671,927	671,927	671,927	671,927	671,927
R^2	0.175	0.175	0.175	0.174	0.175	0.173	0.174	0.174	0.173	0.173
Year F.E	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Sector F.E	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Country*Year F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector*Year F.E	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No

Note: Robust standard errors. All variables are in logs. The sample covers firms over 1995-2007 from all sectors excluding financial activities and wholesale trade. Superscripts ***, **, * denote statistical significance at the 1, 5 and 10% levels respectively.

Table 9: 2SLS regression with single-market exporters

	Dependent variable: $Export_{ijst}$ 2SLS estimation with Instrument variable:$Partners - PI_{it}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Financial frictions	$Liquidity_{it}$	$Collateral_{it}$	$FinCharges_{it}$	$Firm - PI_{it}$	$Liquidity_{it}$	$Collateral_{it}$	$FinCharges_{it}$	$Firm - PI_{it}$
Coefficient ($\hat{\beta}$)	58.52	-10.945**	-1.019***	-2,715.7***	39.906**	-10.440***	-1.021***	-2,843.296***
	(36.116)	(0.925)	(0.048)	(212.411)	(16.949)	(0.856)	(0.049)	(231.371)
Control variables								
Total assets	10.229*	0.375***	-0.239***	0.532***	7.149**	0.666***	-0.242***	0.531***
	(5.981)	(0.015)	(0.037)	(2.808)	(0.443)	(0.014)	(0.038)	(0.006)
Productivity	1.299	-0.555***	-0.331***	-0.203	0.882**	-0.049***	-0.332***	-0.211
	(0.796)	(0.015)	(0.018)	(0.019)	(0.014)	(0.011)	(0.018)	(0.020)
Nb employees	-10.370*	-0.831***	-0.435***	-0.203***	-7.172**	-0.806***	-0.434***	-0.276***
	(6.213)	(0.046)	(0.008)	(0.007)	(2.918)	(0.042)	(0.008)	(0.007)
Group	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	671,886	671,886	671,886	671,886	671,927	671,927	671,927	671,927
Kleibergen-Paap stat.	2.628	172.221	1,643.536	221.994	5.568	187.319	1,616.850	200.330
Year F.E	No	No	No	No	Yes	Yes	Yes	Yes
Sector F.E	No	No	No	No	Yes	Yes	Yes	Yes
Country*Year F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector*Year F.E	Yes	Yes	Yes	Yes	No	No	No	No

Note: Robust standard errors, clustered by firm*year in parentheses. All variables are in logs. The sample covers firms over 1995-2007 from all sectors excluding financial activities and wholesale trade. Superscripts ***, **, * denote statistical significance at the 1, 5 and 10% levels respectively.

can be transposedto other countries, our results also provide a support to improve trading process across countries by improving administrative processes and logistics infrastructure.

Appendices

A List of variables

Variable name	Description
$Export_{ijst}$	firm-level export sales in sector s by destination j over year t
$Liquidity_{it}$	firm-level ratio of short-term liabilities over short-term assets at year t.
$Collateral_{it}$	firm-level ratio of total assets over tangible assets at year t.
$FinCharges_{it}$	firm-level ratio of financial charges over turnover at year t.
$Firm - PI_{it}$	firm-level amount of payment incidents generated by firm i over turnover at year t. We estimate the model with ln(1+ratio).
$Partners - PI_{it}$	firm-level amount of firm i's partners payment incidents (generated by the firm's trading partners) over turnover at year t. We estimate the model with ln(1+ratio).
Total assets	firm-level amount of total assets at year t.
Nb of employees	total number of employees of firm i at year t.
Productivity	firm-level value added per employee at year t.
Group	this variable controls for firms belonging to a group. We define four dummy variables to identify if a firm is a head of a group, a subsidiary, in the periphery of a group or independent.
longDist	this dummy variable eqals 1 if the average distance travelled by a firm's yearly exports is higher than the median and 0 otherwise.
longExTime	this dummy variable eqals 1 if the average exporting time associated to a firm's yearly exports is higher than the median and 0 otherwise.

B First-stage results

Table 10: First stages

	Dependent variable: Financial frictions							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Financial frictions	$Liquidity_{it}$	$Collateral_{it}$	$FinCharges_{it}$	$Firm-PI_{it}$	$Liquidity_{it}$	$Collateral_{it}$	$FinCharges_{it}$	$Firm-PI_{it}$
Instrument: $Partners-PI_{it}$	0.093***	3.647***	35.560***	0.008***	-4.272***	3.832***	35.146***	0.007***
	(0.005)	(0.308)	(1.131)	(0.001)	(0.532)	(0.306)	(1.128)	(0.001)
Control variables								
Total assets	-0.153***	-0.001***	-0.724***	-1.82e-6	-0.153***	-0.002***	-0.724**	-1.80e-6
	(0.002)	(0.001)	(0.005)	(2.15e-6)	(0.002)	(0.001)	(0.005)	(2.14e-06)
Productivity	-0.021***	0.009***	-0.401***	-7.14e-5***	-0.021***	0.010***	-0.401***	-7.15e-5***
	(0.003)	(0.002)	(0.007)	(3.19e-6)	(0.003)	(0.002)	(0.007)	(3.19e-6)
Nb employees	0.161***	-0.042***	-0.152***	7.39e-7	0.160***	-0.042***	-0.151***	6.90e-7
	(0.002)	(0.001)	(0.005)	(2.31e-6)	(0.002)	(0.001)	(0.005)	(2.31e-6)
Group	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,700,069	4,700,069	4,700,069	4,700,069	4,700,083	4,700,083	4,700,083	4,700,083
# Clusters (it)	672,001	672,001	672,001	672,001	672,015	672,015	672,015	672,015
R^2	0.125	0.237	0.711	0.039	0.121	0.235	0.710	0.035
Year F.E	No	No	No	No	No	Yes	Yes	Yes
Sector F.E	No	No	No	No	No	Yes	Yes	Yes
Country*Year F.E	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector*Year F.E	Yes	Yes	Yes	Yes	Yes	No	No	No

Note: Robust standard errors, clustered by firm*year in parentheses. All variables are in logs. The sample covers firms over 1995-2007 from all sectors excluding financial activities and wholesale trade. Superscripts ***, **, * denote statistical significance at 1, 5 and 10% levels respectively.

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